

TABLE OF CONTENTS

EKHDRD-AAV1

1	Features	58
2	Specifications	59
	Technical Specifications	59
	Electrical Specifications	60
3	Capacity tables	61
	Combination table	61
4	Dimensional drawing & centre of gravity	62
	Dimensional drawing	62
5	Piping diagram	63
6	Wiring diagram	64
	Wiring diagram	64
	External connection diagram	67
7	Sound data	68
	Sound pressure spectrum	68
	Sound power spectrum	69
8	Operation range	70
9	Hydraulic performance	72
	Static pressure drop unit	72

1 Features

- High temperature application: up to 80°C without electric heater
- Single phase large capacity indoor unit
- Cost effective alternative to a fossil fuel boiler
- Low energy bills and low CO2 emissions
- Easy to install
- Total solution for year round comfort

5

1



2 Specifications

2-1 Technical Specifications				EKHBRD011AAV1	EKHBRD014AAV1	EKHBRD016AAV1
Casing	Colour			Metalic grey		
	Material			Precoated sheet metal		
Dimensions	Packing	Height	mm	860	860	860
		Width	mm	680	680	680
		Depth	mm	800	800	800
	Unit	Height	mm	705	705	705
		Width	mm	600	600	600
		Depth	mm	695	695	695
Weight	Unit		kg	144,25		
	Packed Unit		kg	153	153	153
Packing	Material			EPS		
				Cardboard		
				MDF		
				Wood (pallet)		
	Weight			8,75		
Main components	Refrigerant side heat exchanger	Type		Plate heat exchanger		
		Quantity		1	1	1
Refrigerant side heat exchanger	Plates	Quantity		60	60	60
Main components	Refrigerant side heat exchanger	Material		AISI 316		
		Insulation material		EPDM type		
	Pump	Type		DC motor		
		Nr. of speed		inverter controlled		
Pump	Nominal ESP unit	Heating	kPa	94,0	91,9	89,7
Main components	Pump	Power input	W	87	95	101
	Water side Heat exchanger	Type		Plate heat exchanger		
		Qty		1	1	1
Water side Heat exchanger	Plates	Quantity		50	50	50
Main components	Water side Heat exchanger	Material		AISI 316		
		Water volume	l	2,78	2,78	2,78
Water side Heat exchanger	Water flow rate Nom.	Heating	l/min	15,8	20,1	22,9
Main components	Water side Heat exchanger	Water flow rate Max.	l/min	31,6	40	45,8
		Insulation material		EPDM type		
	Expansion vessel	Volume	l	12	12	12
		Max. water pressure	bar	3	3	3
		Pre pressure	bar	1	1	1
	Water filter	Diameter perforations	mm	1	1	1
		Material		Brass		
	Cascade compressor	Quantity		1	1	1
Cascade compressor	Motor	Type		Hermetically sealed scroll compressor		
		Starting Method		Direct on line		
Motor	Crankcase Heater	Quantity		1	1	1
Cascade compressor	Motor	Crankcase Heater Output	W	33	33	33
Water circuit	Piping connections diameter		inch	G 1"1/4 (female)		
	Piping		inch	1"		
	Safety valve		bar	3	3	3
	Manometer			Yes		
	Drain valve / Fill valve			Yes		
	Shut off valve			Yes		
	Air purge valve			Yes		
Heating water system	Water volume	Min	l	20	20	20
		Max	l	400	400	400

2 Specifications

2-1 Technical Specifications				EKHBRD011AAV1	EKHBRD014AAV1	EKHBRD016AAV1
Refrigerant Circuit	Gas side diameter		mm	15,9		
	Liquid side diameter		mm	9,52		
	High pressure side	Design pressure	bar	38	38	38
Sound level	Sound Pressure		dBA	43(1) / 46(2)	45(1) / 46(2)	46(1) / 46(2)
Sound Level Night Quiet	Sound Pressure		dBA	40	43	45
Ambient	Heating	Min	°C	-20	-20	-20
		Max	°C	20	20	20
	Domestic hot water	Min	°C	-20	-20	-20
		Max	°C	35	35	35
Waterside	Heating	Min	°C	25	25	25
		Max	°C	80	80	80
	Domestic hot water	Min	°C	25	25	25
		Max	°C	80	80	80
Installation place				Indoor		
Notes				Nominal water flow rate for Dt = 10°C		
				Maximum water flow rate for Dt = 5°C		
				(1) Sound levels are measured at condition 1: EW: 55°C; LW: 65°C		
				(2) Sound levels are measured at condition 3: EW: 70°C; LW: 80°C		
				Sound level in night quiet mode is measured at condition 1: EW: 55°C; LW: 65°C		
				Sound level is valid in free field condition because it is measured in a semi-anechoic room. Measured value under actual installation conditions will be higher due to environmental noise and sound reflections. Values are sound pressure values measured at all sides (front, back, left, right, top) at 1m distance. The values do not occur simultaneously on all mentioned sides.		
				For details on operation range: cf. TW drawing		

2-2 Electrical Specifications				EKHBRD011AAV1		EKHBRD014AAV1		EKHBRD016AAV1	
Electric heater	Power Supply	Name		V1					
		Phase		1~					
		Frequency	Hz	50		50		50	
		Voltage	V	220-240					
Electric heater	Current	Minimum Ssc value		Equipment complying with EN/IEC 61000-3-12 **					
	Maximum running Current	Heating	A	22.5		23.8		23.8	
	Recomended fuses		A	25		25		25	
	Voltage range	Minimum		198					
		Maximum		254					
Wiring connections	For Power Supply	Quantity		2G					
		Type of wires		(3) Select diameter and type according to national and local regulations					
		Quantity		2G + 2G					
		Connection type		For power supply with benefit kWh rates					
		Type of wires		(3) Select diameter and type according to national and local regulations					
Power Supply Intake				Both indoor and outdoor unit					
Wiring connections	Connection type		For connection with outdoor unit						
	Quantity of wires		2		2		2		
	Type of wires		F1+F2						
Notes				(**) European/International Technical Standard setting the limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16A and <= 75A per phase					
				In accordance with EN/IEC 61000-3-11(*), it may be necessary to consult the distribution network operator to ensure that the equipment is connected only to a supply with Zsys(***) <= Zmax					
				Ssc: Short-circuit power					
				(*) European/International Technical Standard setting the limits for voltage changes, voltage fluctuations and flicker in public low-voltage supply systems for equipment with rated current <= 75A					
				(***) System impedance					

3 Capacity tables

3 - 1 Combination table

EKHBRD-AAV1

I. Pair outdoor / pair indoor combination table

Heating only indoor unit	Heating only outdoor unit	ER(S/R)Q011AAV1	ER(S/R)Q014AAV1	ER(S/R)Q016AAV1	ER(S/R)Q011AAV1	ER(S/R)Q014AAV1	ER(S/R)Q016AAV1
EKHBRD011AAV1		○	—	—	—	—	—
EKHBRD014AAV1		—	○	—	—	—	—
EKHBRD016AAV1		—	—	○	—	—	—
EKHBRD011AAV1		—	—	—	○	—	—
EKHBRD014AAV1		—	—	—	—	○	—
EKHBRD016AAV1		—	—	—	—	—	○

Note:
ERRQ units include special equipment (insulation, heater sheet, ...) to ensure good operation in areas where low ambient temperature can occur together with high humidity conditions. In such conditions the ERSQ models may experience problems with severe ice build up on the aircooled coil. In case such conditions are expected, the ERRQ must be installed instead. These models contain countermeasures (insulation, heater sheet, ...) to prevent freeze up.

II. Kit availability

1. Kits connected to the outdoor unit

Reference	Description	ERSQ011**	ERSQ014**	ERSQ016**	ERRQ011**	ERRQ014**	ERRQ016**
EKDK04(1)	Drain kit	○	○	○	—	—	—
EKBPTH16A	Bottom plate heater	○	○	○	—	—	—

2. Kits connected to the indoor unit

Reference	Description	011AAV1	011AAV1	014AAV1	014AAV1	016AAV1	016AAV1
	Heating only model EKHBRD**						
EKHTS200A	Stainless domestic hot water tank 200l	○	○	○	○	○	○
EKHTS260A	Stainless domestic hot water tank 260l	○	○	○	○	○	○
EKHTSU200AA	Stainless domestic hot water tank 200l UK - Version	○	○	○	○	○	○
EKHTSU260AA	Stainless domestic hot water tank 260l UK - Version	○	○	○	○	○	○
EKHTSP200AA	Stainless domestic hot water tank 200l passivated tank with service hole	○	○	○	○	○	○
EKHTSP260AA	Stainless domestic hot water tank 260l passivated tank with service hole	○	○	○	○	○	○
EKRPIHBA	Digital I/O PCB	○	○	○	○	○	○
EKRPIAHTA	Demand PCB (3)	○	○	○	○	○	○
EKRUAHTA	Remote user interface (4)	○	○	○	○	○	○
EKRTH	Room thermostat (2)	○	○	○	○	○	○
EKRTR	Room thermostat (2)	○	○	○	○	○	○
EKRTE	Room thermostat (2)	○	○	○	○	○	○

Kits connected to the domestic hot water tank

Reference	Description	200A	260A	200AA	260AA	200AA	260AA
	EKHTS EKHTSU EKHTSP						
EKUHWHTA	Option kit for UK EKHTSU200-270A	-	-	○	○	-	-
EKFMAHTA (5)	Option kit for standalone tank	○	○	○	○	○	○

Remarks: Other combinations are not guaranteed

(1) If bottom plate heater tape is installed (EKBPTH16A), it is not allowed to install a drain kit

(2) requires Demand PCB EKRPIAHTA

(3) Required to install to be able to connect Roomthermostat or BUH kit

(4) Same controller as supplied with Cascade unit can be mounted parallel or on other location. If 2 controllers are installed, the installer needs to select 1 master and 1 slave.

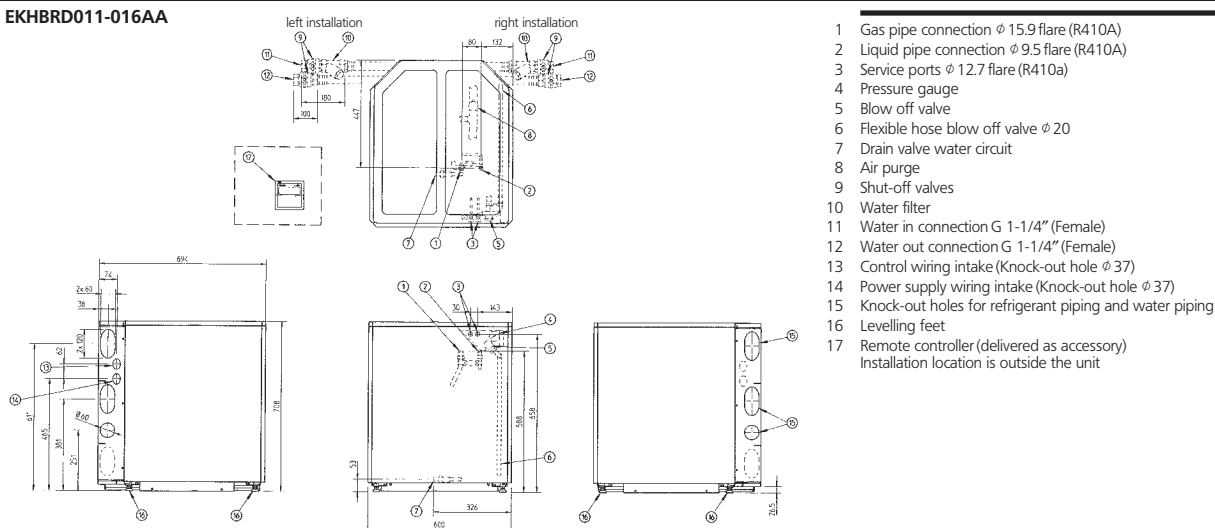
(5) Only required if tank is NOT mounted on top of cascade indoor unit.

3TW58749-2B

4 Dimensional drawing & centre of gravity

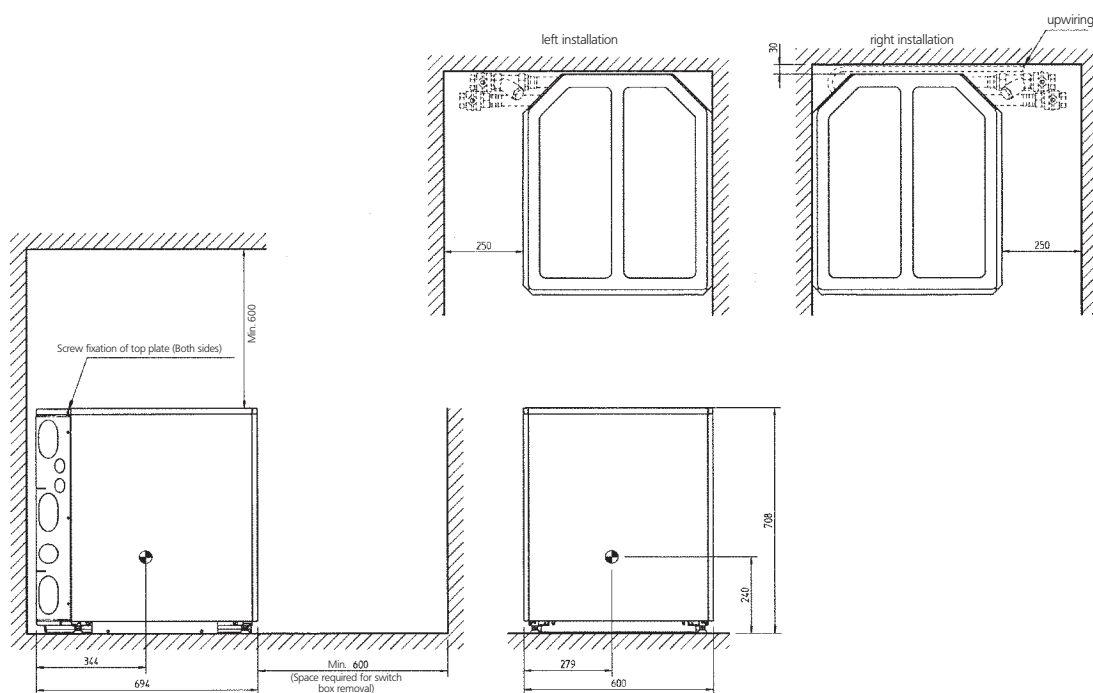
4 - 1 Dimensional drawing

EKHBRD011-016AA



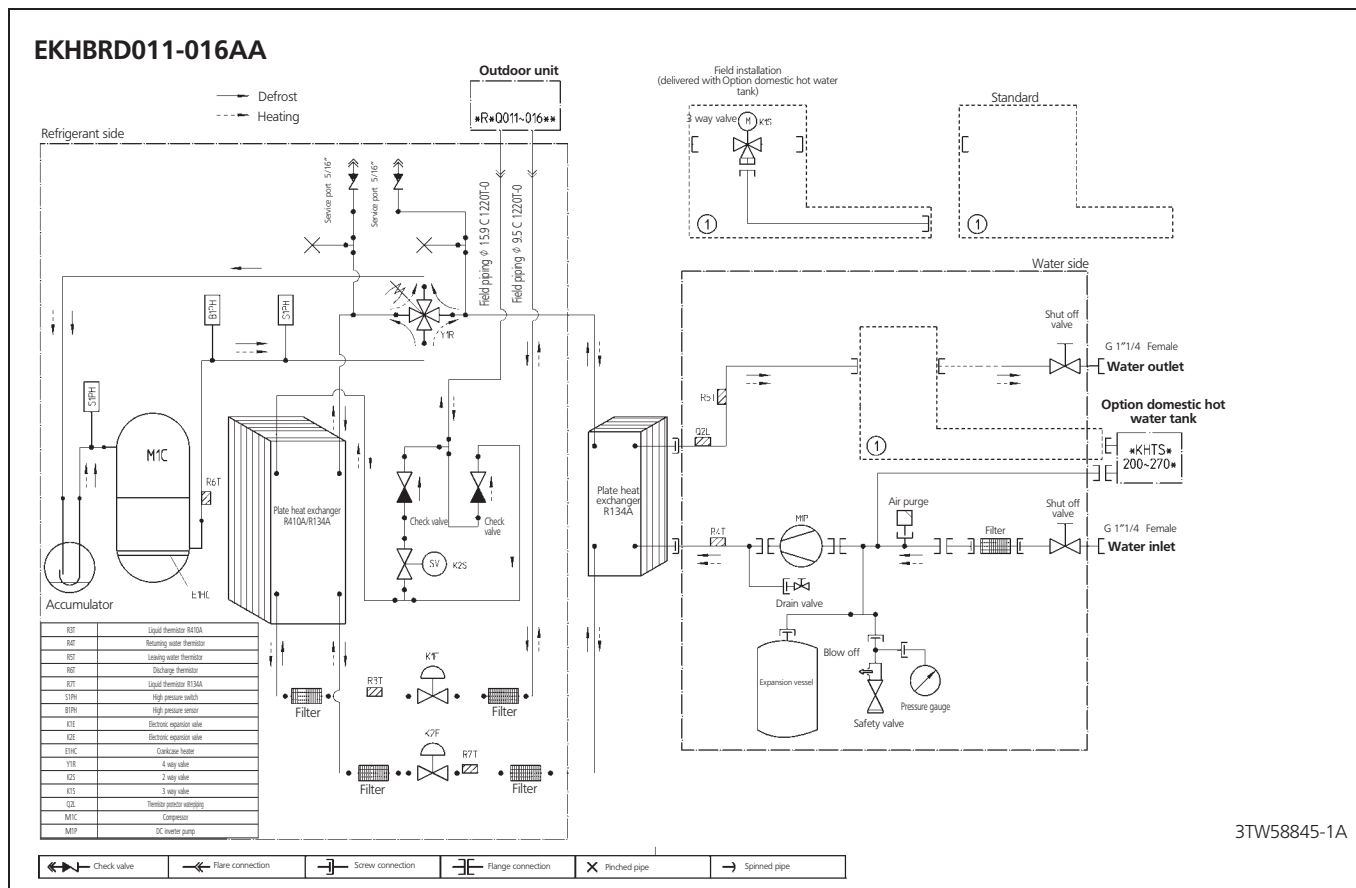
5

4



3TW58844-1A

5 Piping diagram



6 Wiring diagram

6 - 1 Wiring diagram

NOTES TO GO THROUGH BEFORE STARTING THE UNIT

X1M : Main terminal
X2M : Fieldwiring terminal for AC
X3M : Fieldwiring terminal for DC

— — — — : Earth wiring
- - - - - : Field supply



: Option



: Wiring depending on model



: Not mounted in switchbox



: PCB

— **/12.2 : Connection ** continues on page 12 column 2



: Several wiring possibilities

User installed:

KHTS = Domestic hot water tank
*KRTW = Room thermostat (Wired)
*KRTR = Room thermostat (Wireless)
*KRTETS = External temperature sensor for *KRTR
*KRUAHTA = Remote user interface
*KRP1HBAA = Digital I/O PCB
*KRP1AHTA = Demand PCB
*KBPTH16A = Bottom plate heater

Legend

* : included in option kit
: field supplied

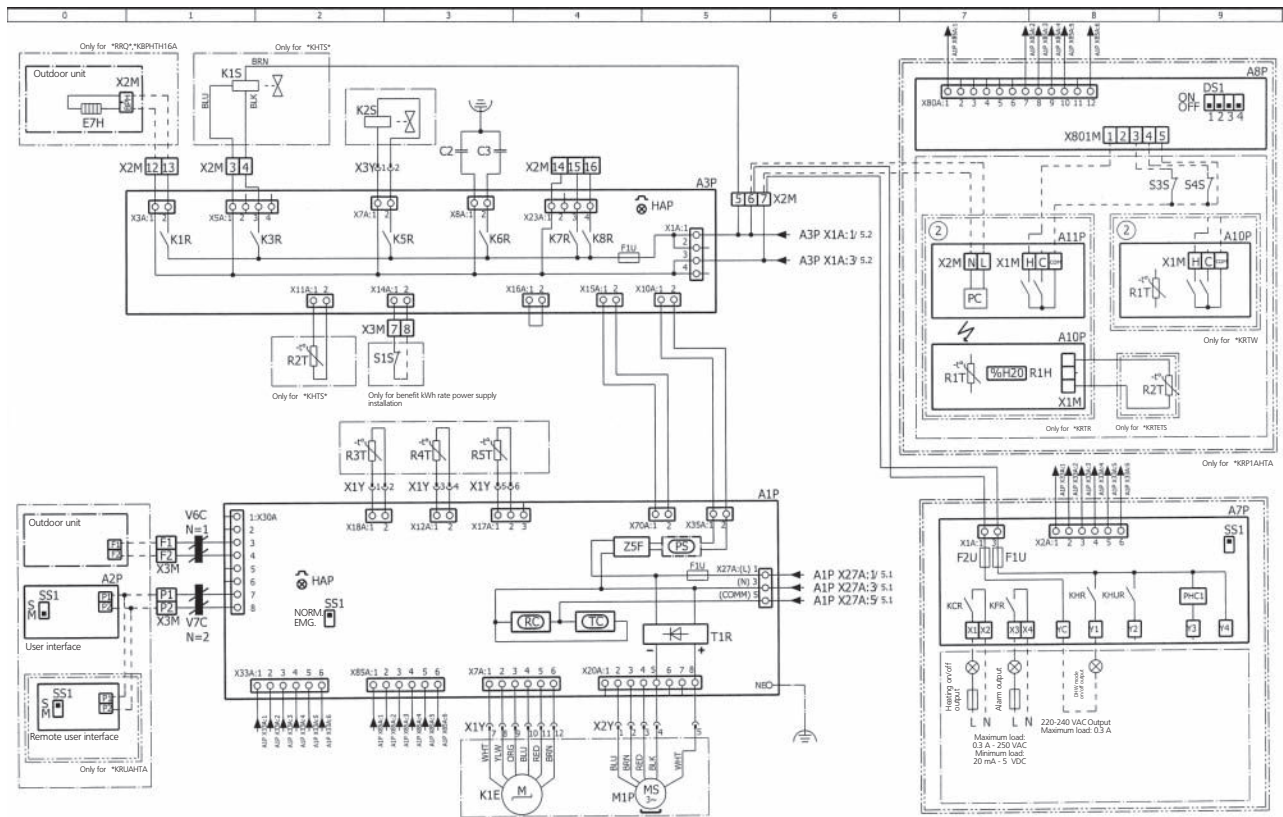
A1P : Main PCB
A2P : User interface PCB
A3P : control PCB
A4P : Inverter PCB
A5P : QA PCB
A6P : Filter PCB
A7P * : Digital I/O PCB
A8P * : Demand PCB
A9P : Service PCB
A10P * : ThermostatPCB
A11P * : Receiver PCB
B1PH : High pressure sensor
B1PL : Low pressure sensor
BS1-BS4 (A9P) : Push button
C1 : Capacitor
C2-C3 : Filter capacitor
C1-C3 (A4P) : PCB Capacitor
DS1 (A*P) : Dipswitch
E7H * : Bottom plate heater (only in combination with ERRQ* outdoor unit or ERSQ* outdoor unit with option EKBPTH16A)
E1HC : Crankcase heater
F1U (A1PA3P) : Fuse (T, 3.15A, 250V)
F1U (A6P) : Fuse (T, 6.3A, 250V)
F1U-F2U (A7P) * : Fuse (5A, 250V)
F3U-F4U : Fuse (T, 6.3A, 250V)
H1P-H7P (A9P) : PCB LED
HAP (A*P) : PCB LED
IPM1 : Integrated power module
K1A : Interface relay
K1E : Electronic expansion valve
K2E : Electronic expansion valve
K*R (A*P) : PCB Relay
K1S * : 3 way valve
K2S : 2 way valve
M1C : Compressor
M1F-M2F : Switchbox cooling fan
M1P : DC inverter pump
PC (A11P) * : Power circuit
PHC1 : Optocoupler input circuit
PS (A*P) : Switching power supply
Q1DI-Q2DI # : Earth leakage protector
Q2L : Thermal protector water piping
R1-R2 (A4P) : Resistance
R1L : Reactor
R1H (*KRTR) * : Humidity sensor
R1T (*KRTW/R) * : Ambient sensor
R2T (*KHTS) * : Domestic hot water tank Thermistor
R2T (*KRTETS) * : External sensor (floor or ambient)
R3T : Liquid thermistor R410A
R4T : Returning water thermistor
R5T : Leaving water thermistor
R6T : Discharge thermistor
R7T : Liquid thermistor R134a
R8T : Fin thermistor
RC (A*P) : Receiver circuit
S1PH : High pressure switch
S1S # : benefit kWh rate power supply contact
S3S # : Input multiple setpoint 1
S4S # : Input multiple setpoint 2
SS1 (A1P) : Selector switch(emergency)
SS1 (A2P) : Selector switch(master slave)
SS1 (A7P) * : Selector switch
TC (A*P) : Transmitter circuit
T1R-T2R (A*P) : Diode bridge
T3R : Power module
V1C-V8C : Ferrite core noise filter
X1M-X3M : Terminal strip
X*M (A*P) * : PCB terminal strip
X1Y-X4Y : Connector
Y1R : 4 way valve
Z1F-Z5F (A*P) : Noise filter

4TW58846-1B

6 Wiring diagram

6 - 1 Wiring diagram

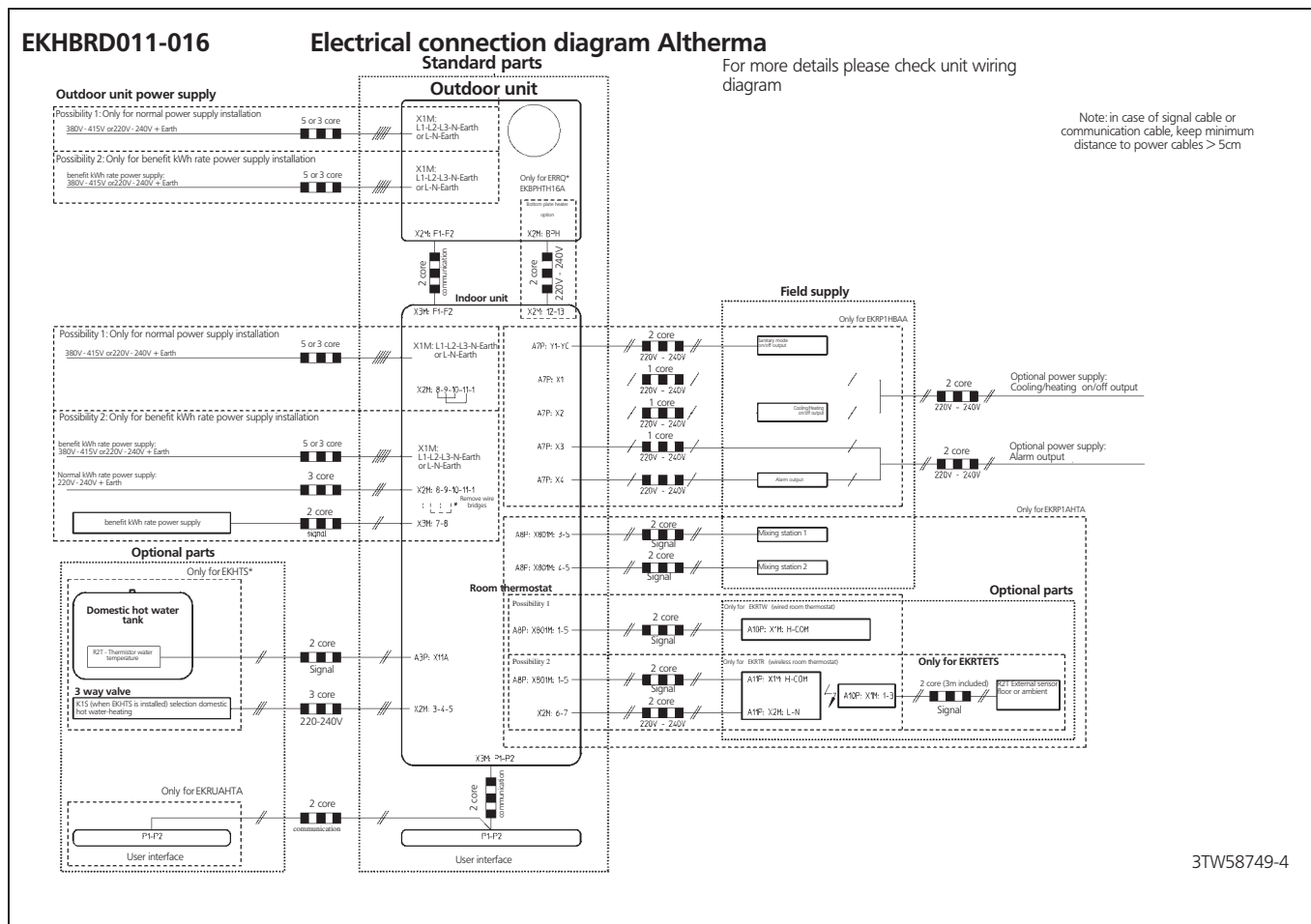
EKHBRD-AAV1



4TW58846-1B

6 Wiring diagram

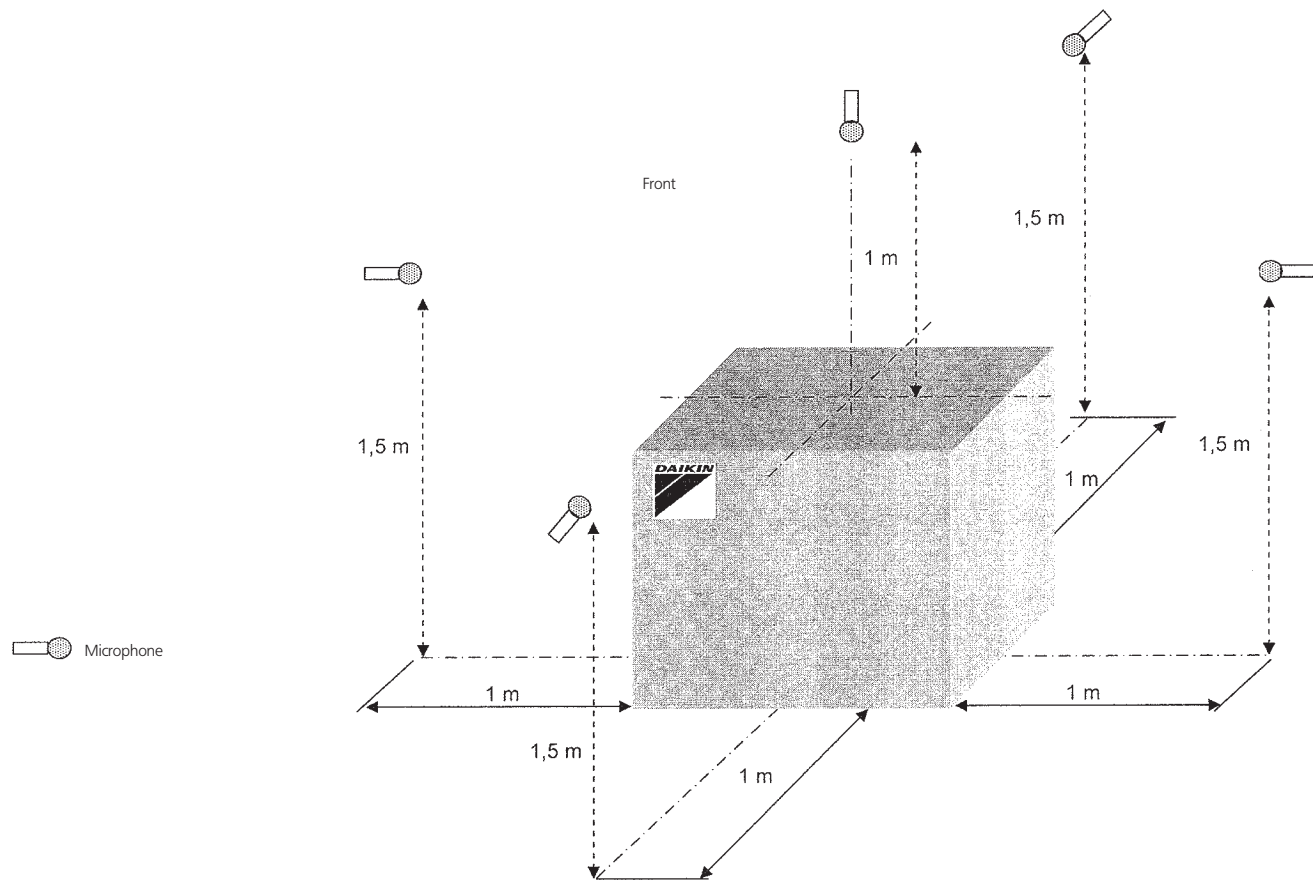
6 - 2 External connection diagram



7 Sound data

7 - 1 Sound pressure spectrum

EKHBRD011-016AA



Sound levels

Sound pressure [dBA] - standalone

	11(V1/Y1)	14(V1/Y1)	16(V1/Y1)
[EW/LW 55/65°C] Front	40	43	46
Left / Right / Back / Top (*)	43	45	46
[EW/LW 70/80°C] Front	46	46	46
Left / Right / Back / Top (*)	46	46	46
[EW/LW 55/65°C] - Low sound mode n°1 Front	39	40	43
Left / Right / Back / Top (*)	40	43	45

Sound pressure [dBA] - Integrated (+Tank)

	11(V1/Y1)	14(V1/Y1)	16(V1/Y1)
[EW/LW 55/65°C] Front	38	39	42
Left / Right / Back / Top (*)	41	44	45
[EW/LW 70/80°C] Front	43	43	43
Left / Right / Back / Top (*)	46	46	46
[EW/LW 55/65°C] - Low sound mode n°1 Front	37	38	39
Left / Right / Back / Top (*)	40	41	44

Notes

- The above data is valid in free field condition, because it is measured in a semi-anechoic room. If sound is measured under actual installation conditions, the measured value will be higher due to environmental noise and sound reflections. Choose the installation location carefully and do not install in a sound sensitive environment (e.g. living room, bedroom, ...)
- dB(A) = A-weighted sound power level (A-scale according to IEC)
- EW = Entering water temperature
- LW = Leaving water temperature
- Reference acoustic pressure 0dB = 20μPa
- Sound pressure level of low sound mode n°2 and n°3 is lower than n°1
- (*) Does not occur simultaneously on all sides.

3TW58847-1B

7 Sound data

7 - 2 Sound power spectrum

EKHBRD011-016AA

	Sound power Lw per Octave band (dB)							Total (dBA)
	125	250	500	1000	2000	4000	8000	LwA
EKHBRD011AAV1	53	61	61	49	43	39	34	59
EKHBRD014AAV1	73	61	61	51	43	42	38	60
EKHBRD016AAV1	72	61	60	49	44	43	39	60

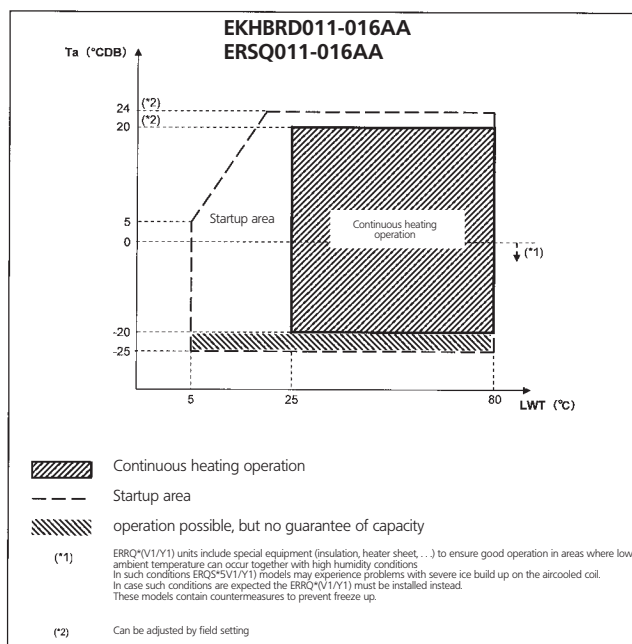
Notes

- Measured according to ISO3744
- Reference acoustic intensity $0\text{dB} = 10\text{E-}6\mu\text{W/m}^2$
- dBA=A-weighted sound power level
- Unit condition: Ta=7/6°C - Heating setpoint70/80°C - Maximum compressor frequency
- If sound is measured under actual installation conditions, the measured value will be higher due to environmental noise and sound reflections. Choose the installation location carefully and do not install in a sound sensitive environment (e.g. living room, bedroom, ...)

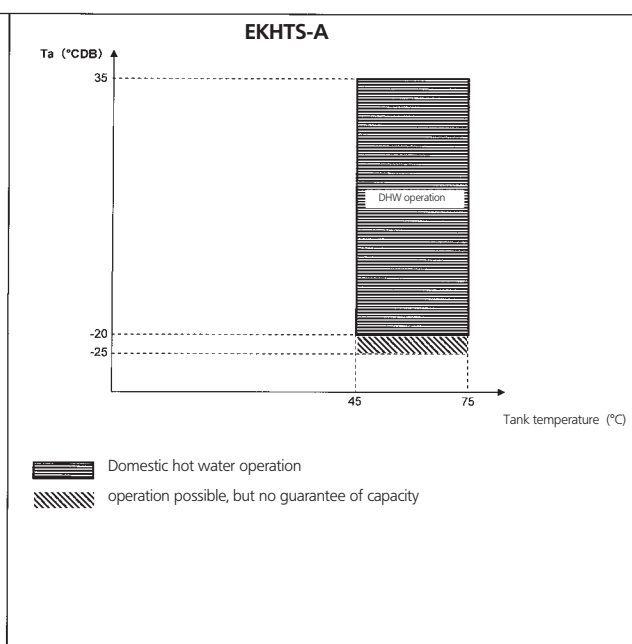
4TW58847-3

8 Operation range

Space heating mode



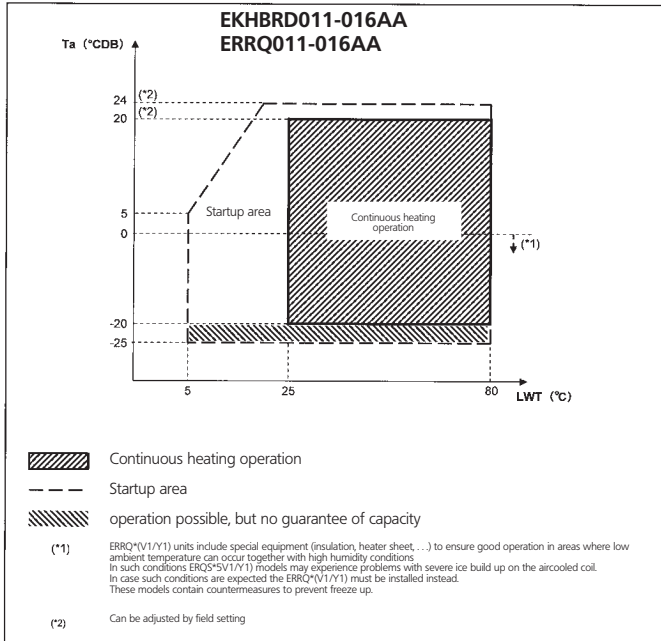
Domestic hot water mode



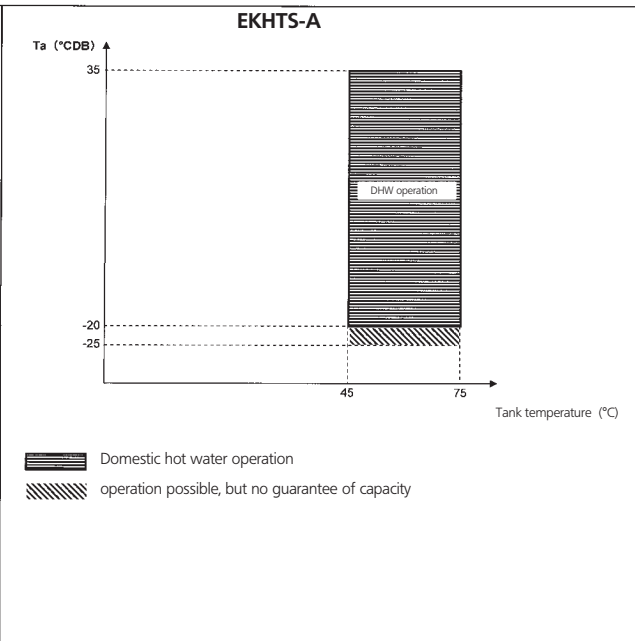
3TW58843-1B

8 Operation range

Space heating mode



Domestic hot water mode

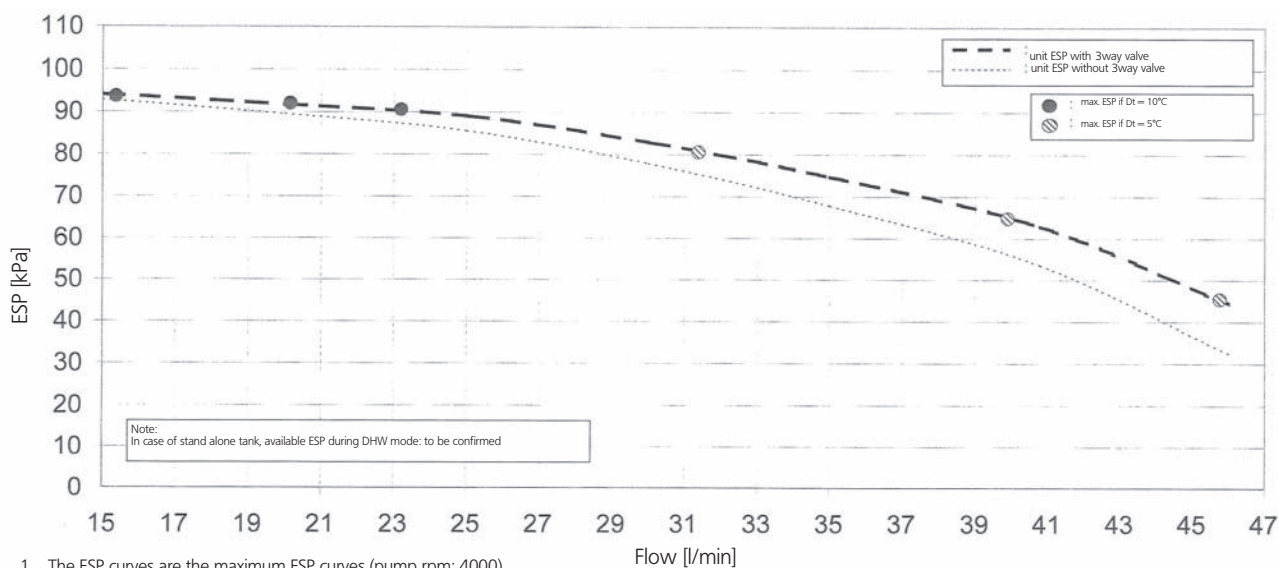


3TW58843-1B

9 Hydraulic performance

9 - 1 Static pressure drop unit

EKHBRD011-016AA



1. The ESP curves are the maximum ESP curves (pump rpm: 4000). The pump of the indoor module is inverter controlled and controls to have a fixed ΔT between return and leaving water temperature.
2. In case of installing a domestic hot water tank there is an additional pressure drop over the three way valve (delivered as accessory with the tank)

ESP: External static pressure
Flow: waterflow through the unit

Warning

1. Selecting a flow outside the curves can cause damage to or malfunction of the unit. See also minimum and maximum allowed water flowrange in the technical specifications.
2. Water quality must be according to EN directive EC 98/83 EC.

3TW58849-6